File: Burial Packaging
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SUMMARY OF RECENT BURIAL PACKAGING ACTIVITY

Activity currently being conducted in the field of burial packaging may be divided into three phases. Of these the principle phase is the continuing research and development on burial containers and materials. Among the developed items are the stainless steel box and nylon back barrier material.

Laboratory and field testing of all types of possible burial containers and barrier materials forms the second phase of burial packaging. In addition to the testing of the stainless steel box and the nylon material, we have recently received the first results of field tests on an Air Force fiberglass plastic box, a type of self-sealing rubber, varieties of cold and hot dip plastics and such common commercial items as polyethylene bags and tin cans.

From time to time the customers place requirements for assistance in a specific burial problem. This forms phase number three. Usually these requests are for the design and fabrication of a limited number of small burial containers of a specific size or shape. Because each request is for assistance on a specific job, the requirements for containers are never quite the same. Inasmuch as is possible, we make every effort to see that the customer is provided with the right type of burial container or material to suit his specific needs.

Sometimes our customers come to us for technical advice on burial, either general or specific. Here we draw upon our own experience and, through our governmental and industrial contacts, upon the experience of others.

These, then, form our three phases of burial activity. Our research and development efforts are currently being concentrated on two burial containers, the stainless steel box and an Air Force fiberglass box (T-39). The stainless steel box, which is our primary burial container, is currently in developmental production. Large numbers of these boxes have been requested, and some are now in operational use. Tests are being conducted on the fiberglass box preparatory to its modification for use as a second rigid burial container.

With regard to the second phase, the first results are now in on our first large-scale field testing program. Old Colt pistols, bayonets, and signal flares, were packaged for burial and cached in August of 1954 in the following soil and water conditions:

Soil: loam, clay, beach, swamp
Water: fresh, salt, brackish.

Materials tested were:

Stainless steel box
Fiberglass box
Polyethylene
Tin cans
Self-sealing rubber
Hot dip plastic: 149-2, HR-4S, Fungicide
Cold dip plastic
Nylon back barrier material

The above has been repeated in a second location. CONFIDENTIAL

Both the stainless steel and fiberglass boxes provided complete protection for their contents, even under very severe caching conditions such as found in swamp, where the soil is very acidic and abundant in organic content, and salt water, where the boxes were submerged to depths up to ten feet and were covered with muck and barnacles. The stainless steel box showed no signs of rust or deterioration, although the olive drab paint was turned practically black by sulfur dioxide in the swamp. Severe rusting, and in one case, failure, occurred on the fiberglass box hardware, which is made of ordinary steel, but would be changed to stainless steel. Both boxes could be reclosed after inspection, however the stainless steel box provided a more positive and more easily workable closure.

All three types of hot dip plastic appeared to offer excellent protection. There was no evidence of fungus attack, and the plastic had not become brittle. These guns and bayonets were given a double dip, resulting in a very heavy coating of plastic (3/16" - 1/4"). On the other hand, the cold dip afforded essentially no protection at all. Even where protection to the metal surface is provided, this plastic is not strippable as is hot dip, and it will foul the working mechanism of any article such as a pistol to the point where the gun must be completely disassembled and cleaned prior to use.

Where the nylon material was buried in a dry soil, such as loam, it usually afforded complete protection. However, delamination and failure of the heat seal occurred in swamp, beach, and most water locations. When properly sealed this material probably gives as good protection as the hot dip plastic. It is felt that the packages in test were not adequately sealed and new packages are now being prepared for re-test.

The self-sealing rubber was made by Dunlop Gummi Companie in Germany. A source of apparently similar but as yet untested rubber has been located here. This material is very easy to use; the seal is formed by merely folding the rubber back on itself and pressing the edges together. It provided complete protection and seemed to have suffered no deterioration. Its shelf life is still unknown but is probably not as great as the other materials tested. Over a period of time it is naturally subject to moisture vapor transmission.

Polyethylene and tin cans were included in the test mainly as controls. Even so, it was surprising to learn that in some cases even very thin polyethylene bags (on the order of four mils thick) kept railway flares dry enough to be fired after being under water for more than six months. Most polyethylene bags, however, were found to have pin holes and contents ruined. In dry locations, tin cans were still bright and shiny and afforded excellent protection. In severe conditions, however, they were rusted completely through and were worthless.

For all burial situations, the proper choice of the burial site is of equal importance to the choice of burial material used. The rule is simple: if

possible, caches should always be located in dry soil with good drainage, for example on the top of a hill in loam or sandy soil. Clay is not desirable because it tends to trap and hold water.

Additional test results will be forthcoming as further periodic inspections are made. Also, hot dip plastic is being more extensively investigated under a separate program in which a large quantity of medical supplies and food rations were dipped and cached in loam, swamp, and fresh water. The first inspection of these caches is scheduled for June of this year.

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Prepared for [redacted]

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